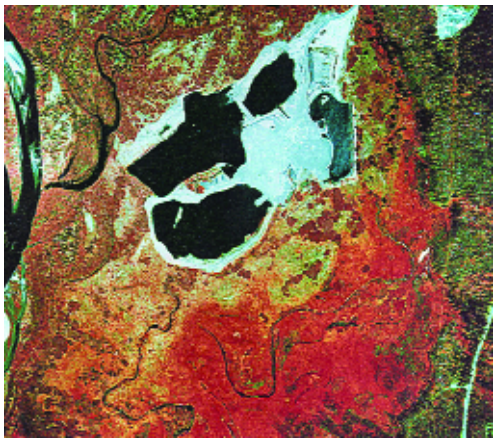
Field studies and funding partnerships help restore wetlands at Snake River gravel pit

by Joel Wagner, David Cooper, Michael Martin, and Steve Haynes

FROM THE 1950S THROUGH THE EARLY 1990S, the National Park Service and the Federal Highway Administration extracted thousands of cubic yards of gravel from the Snake River floodplain within the John D. Rockefeller, Jr., Memorial Parkway, Wyoming. The Snake River gravel pit, located approximately 1 mile south of Flagg Ranch, provided gravel for National Park Service road projects and maintenance activities in the surrounding area. Mining ceased in 1992 when the U.S. Army Corps of Engineers determined that the operation violated the Clean Water Act. Closure of the site left more than 60 acres of poorly vegetated waste piles, steep-walled borrow ponds, and sand and gravel stockpiles visible from U.S. Highway 89/287 and the Snake River. The park elected to resolve these regulatory and resource management issues by reclaiming the abandoned mine to a mix of wetlands, oxbow ponds, and uplands modeled after comparable features on the adjacent, undisturbed floodplain.



ENVIRONMENTAL PROTECTION AGENCY

A source of gravel for the John D. Rockefeller, Jr., Memorial Parkway and neighboring Yellowstone and Grand Teton National Parks from the 1950s to 1990s, the Snake River gravel pit created 60 acres of waste piles, steep-walled borrow ponds, and sand and gravel stockpiles.

"Restoration projects of this size and complexity require rigorous data collection and analysis, innovative design, … careful supervision …, and sufficient funding to do the job right."

The Federal Lands Highway Program and the State of Wyoming Abandoned Mine Lands Program contributed a combined $1.3 million, which was sufficient to complete the final design and implement the project. In early 2002, project partners produced final design drawings and specifications for the construction bid documents. An earthmoving contractor was selected in June and construction lasted from mid-July through October 2002. Under the direction of the design team and the on-site construction manager, the contractor reshaped more than 350,000 cubic yards of mine reject material and topsoil into 55 acres of sedge meadows, willow flats, stream channels, oxbow ponds, and upland features.

The NPS Water Resources Division, Colorado State University, and parkway managers from Grand Teton National Park collaborated on the restoration design. These partners based their design on extensive analysis of soil, vegetation, and hydrologic data collected within the mined area and in nearby undisturbed reference areas. Data from 24 shallow wells and six staff gauges provided water-level information that is critical to wetland and riparian ecosystem design. Special factors to be addressed included the complex hydrology of the site, the need to protect existing western boreal toad breeding habitat, and appropriate use of topsoil that had been preserved during the mining process.

A unique aspect of the design process was the use of field experiments to evaluate the potential for willow establishment from natural seed dispersal. Designing the site to promote natural willow establishment saves money because fewer willow cuttings need to be planted and it helps ensure that the site will be a self-sustaining wetland-riparian ecosystem over the long term. Willow seed traps allowed the design team to evaluate distribution and abundance of seed dispersal across the site. Two experimental plots were also created to determine which combination of available soil types (sand, mine reject material, and topsoil) and water-table elevations would optimize willow establishment from seed. The experiment results guided placement of topsoil at critical elevations throughout the site.

In late spring and early summer 2003, contractors will plant more than 580,000 herbaceous wetland plants and 35,000 willow stakes in specified habitat zones. To ensure preservation of local genetic integrity, nursery contractors collected seed and willow cuttings from within 9 miles (15 kilometers) of the project site. With the

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NPS PHOTO (BOTH)

To restore the area, NPS contractors reshaped reject mine material and topsoil into precise but subtle configurations designed to re-create sedge meadows, willow flats, stream channels, oxbow ponds, and upland features.

A nearby reference site approximates how the area will look after more than 580,000 riparian plants and 35,000 willows are planted in 2003 and given time to mature.

help of the Natural Resources Conservation Service, upland zones will also be revegetated using local seed sources.

Restoration projects of this size and complexity require rigorous data collection and analysis, innovative design, much coordination among cooperators and regulators, tight design specifications, careful supervision of construction and planting phases, and sufficient funding to do the job right. But a final step—monitoring—should not be overlooked. Monitoring of vegetation, hydrology, and soil characteristics will continue for at least three years to document restoration of target wetland habitats and to identify any remedial treatments needed to ensure restoration success. ■

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